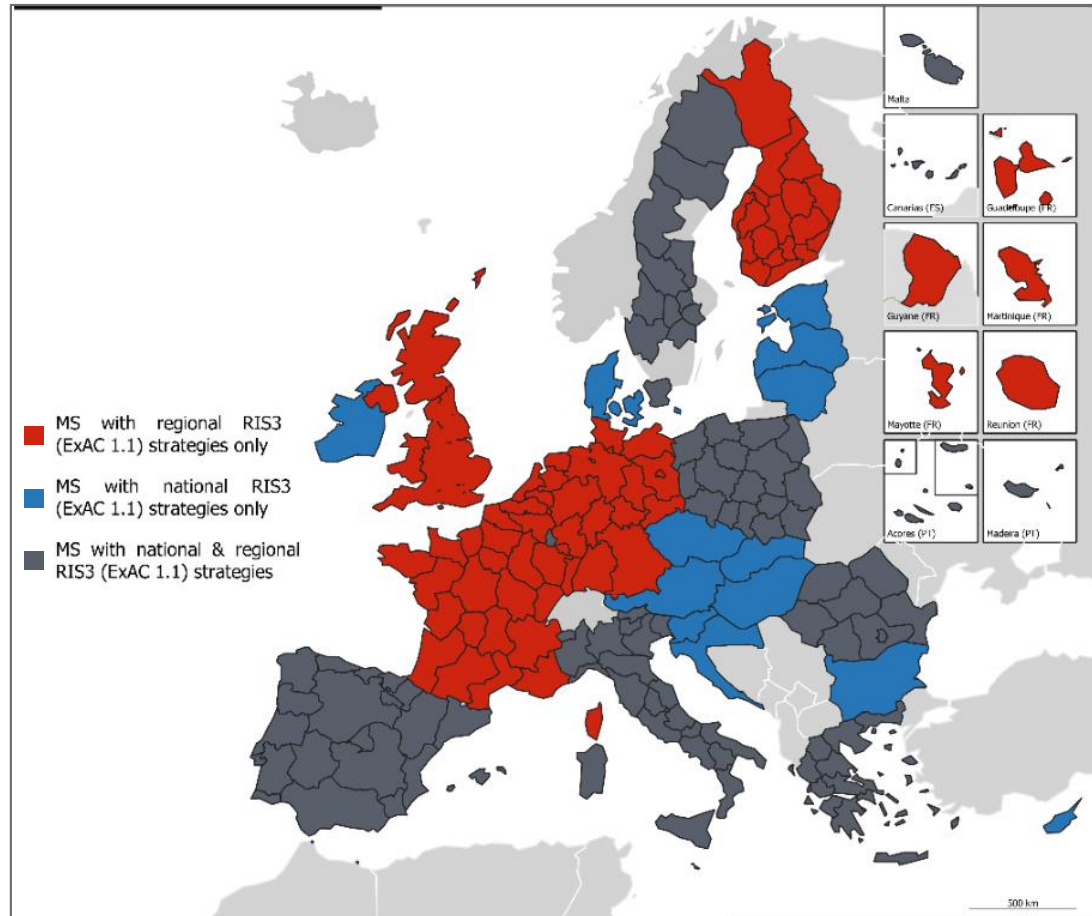


# Study on prioritisation in Smart Specialisation Strategies in the EU

Overview of main findings

# Empirical basis & scope of the study



## Collection of S3 strategies

- **185 S3 strategies** and accompanying documents collected / 181 interviews conducted
- **Creation of an online questionnaire** that was filled in for all 185 S3-strategies

## Analysis of correspondence

- **Datasets were created** (for economic, scientific, techn. profiles and relatedness and complexity)
- **Correspondence and cluster analysis**
- **Ten case studies** conducted

## Assessment of priorities

- **Prioritisation database** was developed (1,014 priorities)
- 88 NACE 2-digit level sectors, 22 FOR 2-digit level dimensions, 35 Technology fields

## Assessment of implementation

- **186 ERDF project/beneficiary lists** collected and connected to the JRC dataset
- **2,876 ERDF calls collected** (2,328 T01 calls)

# Scope of the study and its objectives:



Systematically screen and assess all available smart specialisation strategies



## Research Question 1

**Has a prioritisation been achieved in the RIS3 strategies?**



## Research Question 2

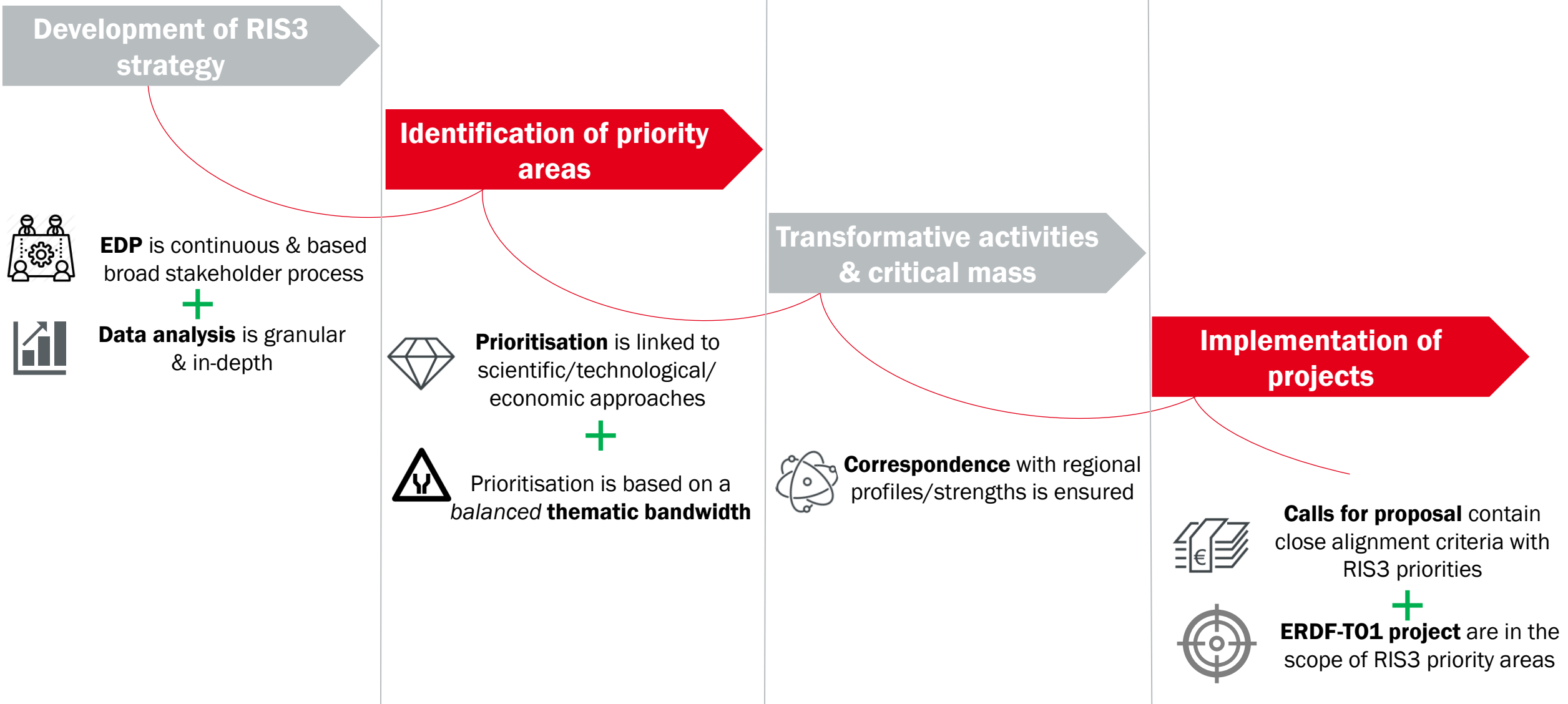
**To what extent do the selected priorities reflect the regional profile?**



## Research Question 3

**How have the RIS3 strategies and the selected priorities been implemented?**

# The ideal RIS3 process



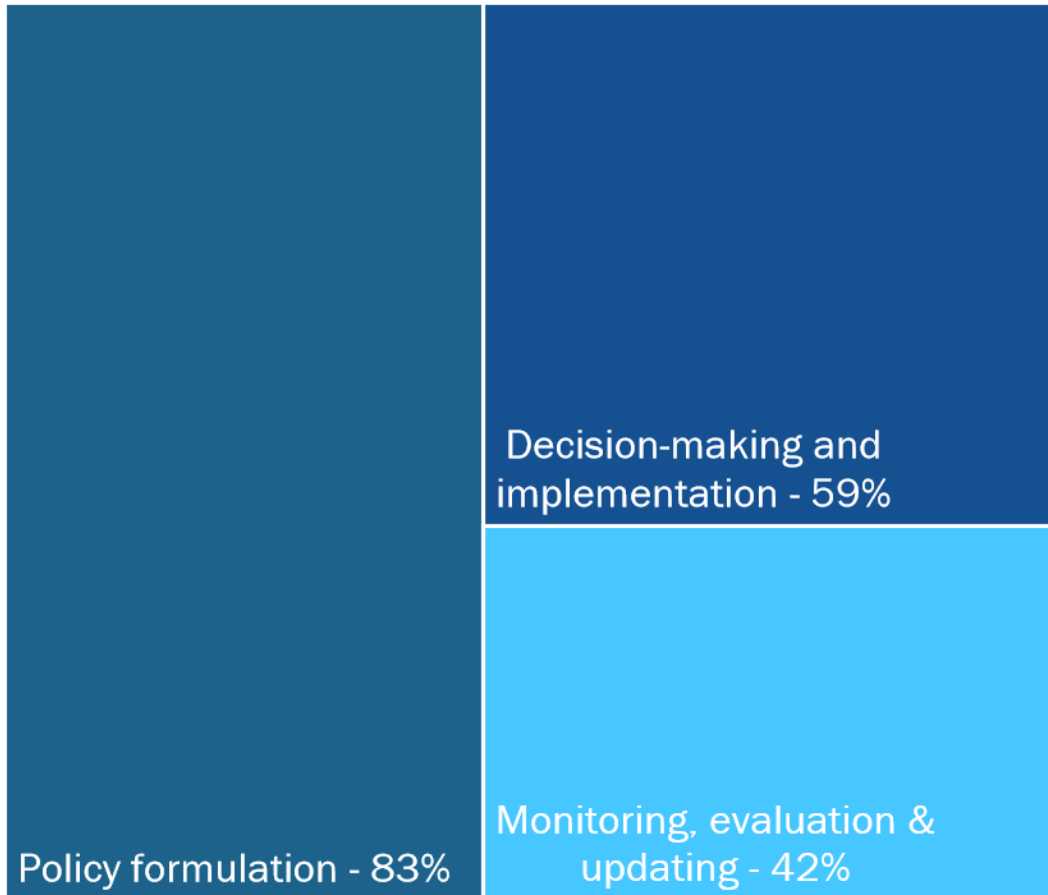


© imagepoint – Mark Brun

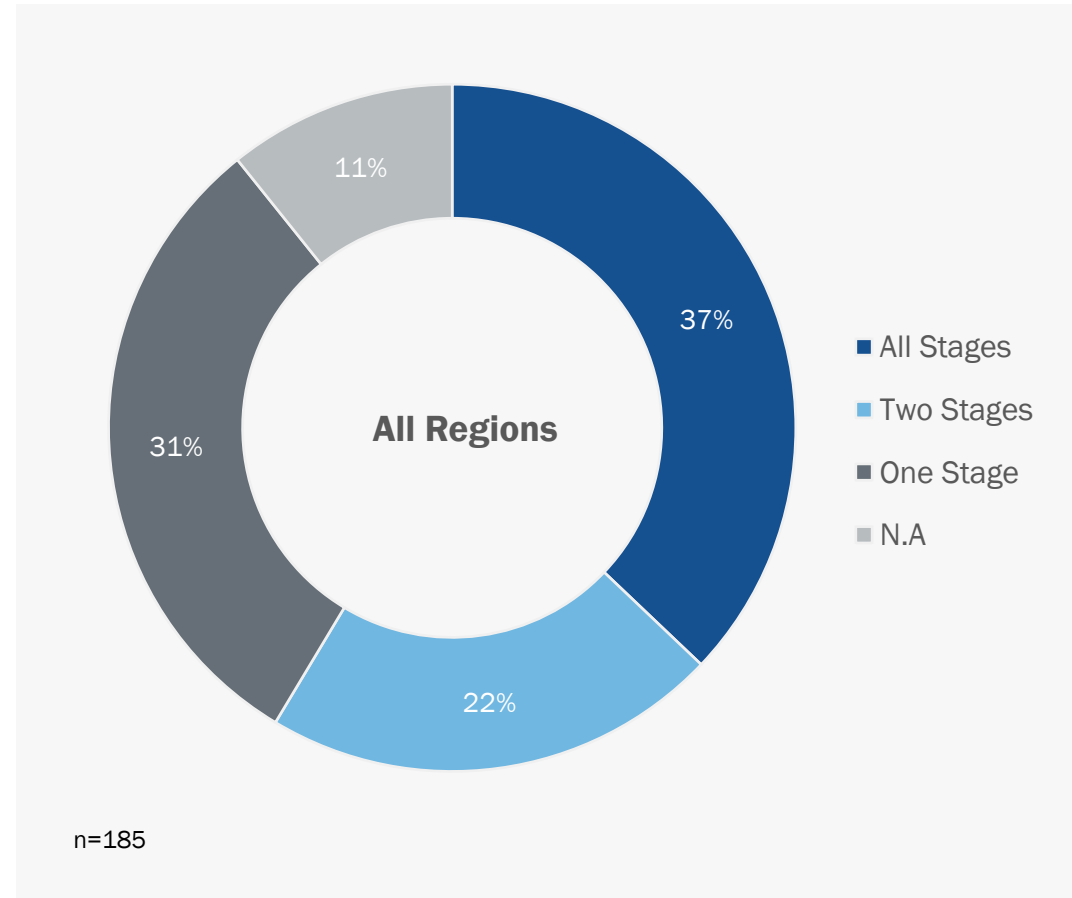
## Prioritisation in S3

# Has the prioritisation been developed through an Entrepreneurial Discovery Process?

## Policy stages that the EDP is used for (%)



## Degree of EDP continuity (%)



# What was the outcome of prioritisation in the S3 strategies?

## TOP-3 scient., techn. & econ. sectors addressed by S3 priority areas

### FOR

1. Engineering (559)
2. ICT (465)
3. Agriculture & Veterinary Science (367)

### TECH

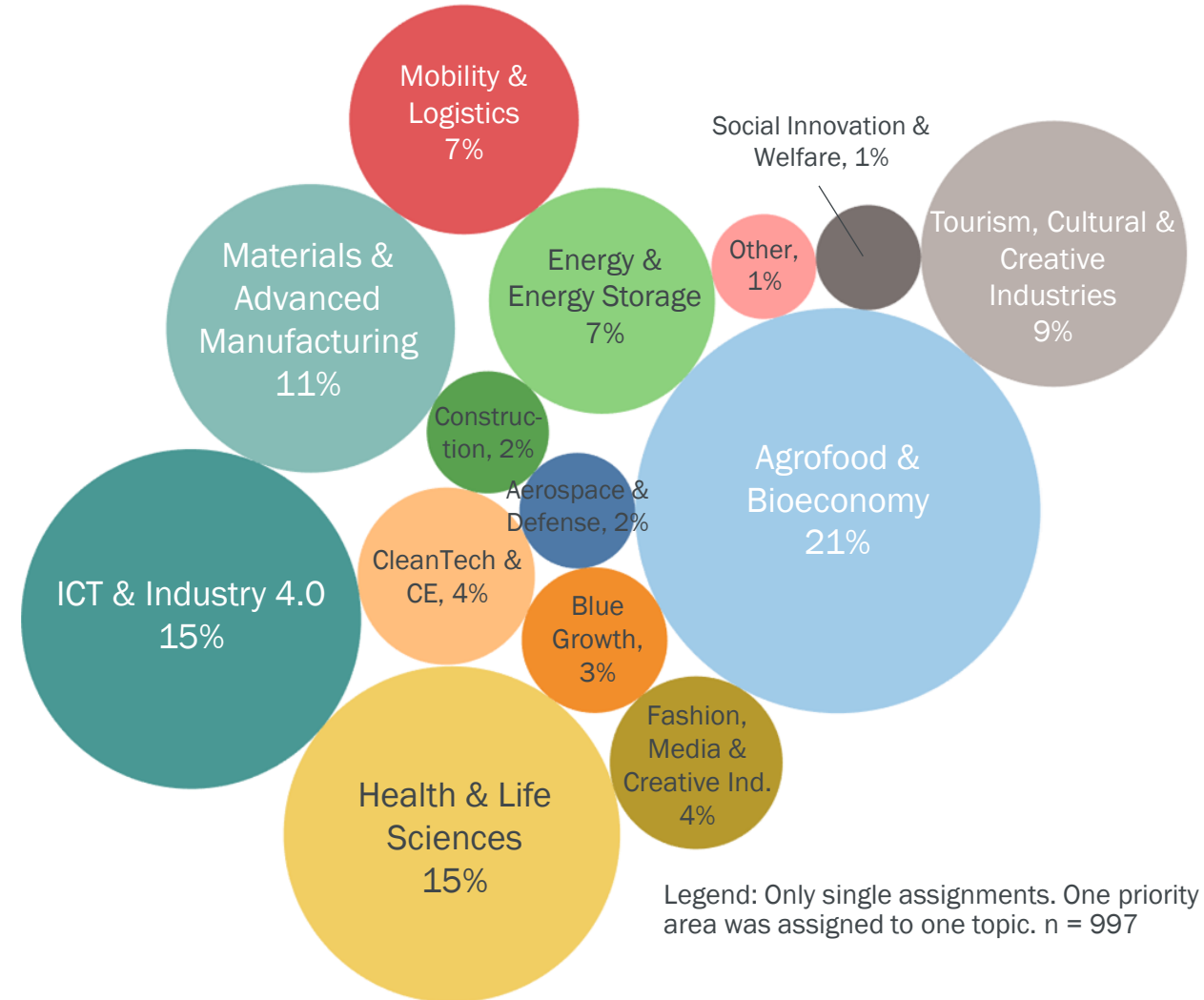
1. Computer technology (432)
2. Digital communication (421)
3. Electrical machinery, ... (327)

### NACE

1. Scientific R&D (513)
2. Computer programming, ... (374)
3. Manuf. of computers, ... (335)

Legend: Contains multiple assignments per priority area, e.g. one priority area can both address the TECH fields Computer technology and digital communication.

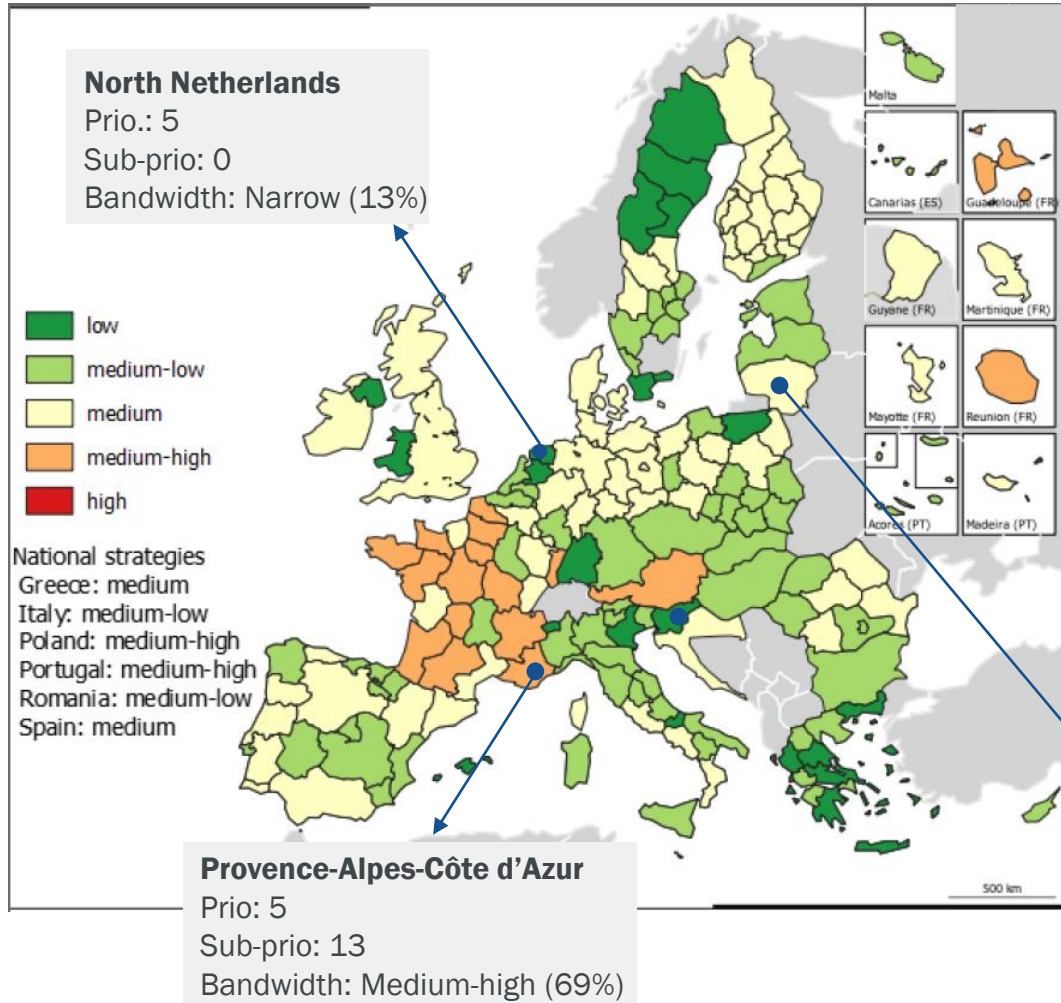
## Share of overarching topics addressed by priority areas



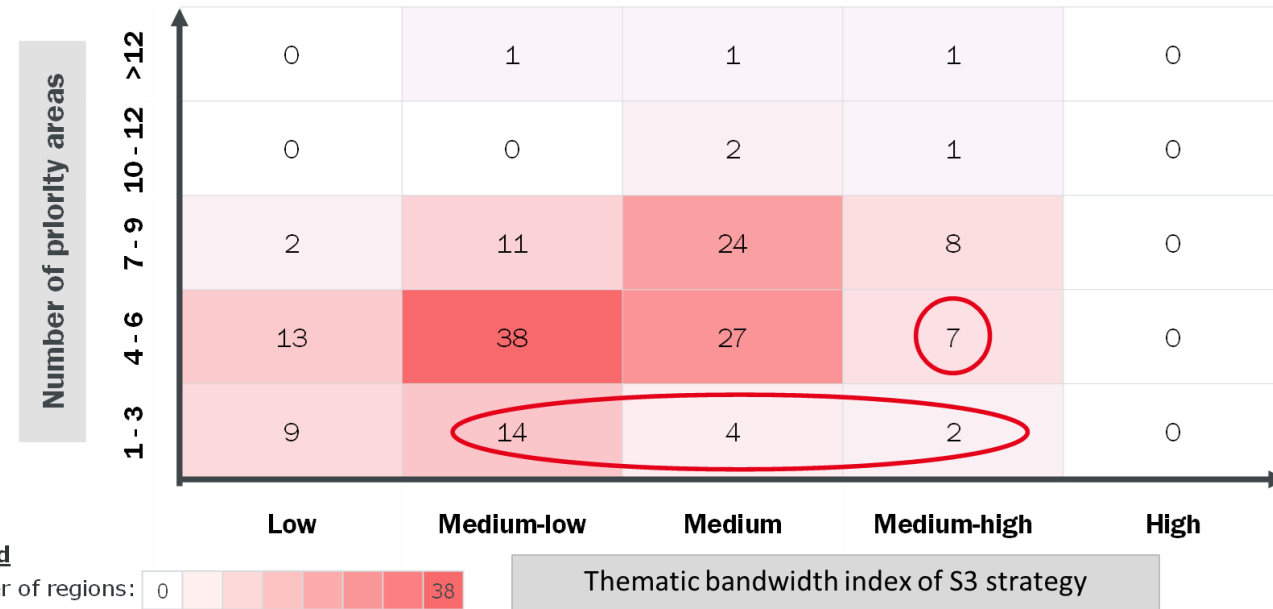
Legend: Only single assignments. One priority area was assigned to one topic. n = 997

# At what level of granularity has this prioritisation taken place?

## Number of priority areas of S3 strategies in the Member States/regions



## Comparison of the number of priority areas with the thematic bandwidth of the S3



Source: Prognos / CSIL (2021). Left figure: n = 185 regions. In both figures, data for the latest strategy year is shown.



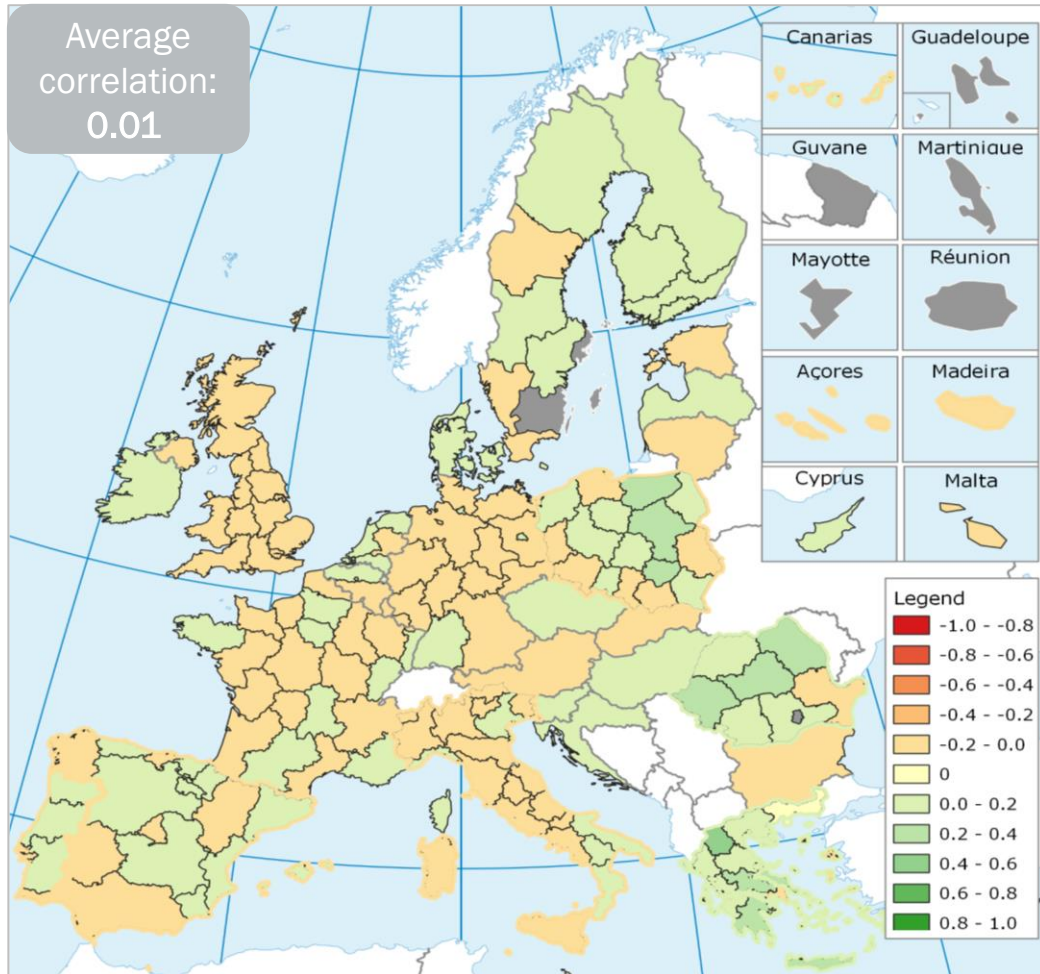


© iStock - freedarst

## **Correspondence with regional profiles**

# How prioritisation reflects **economic** profiles?

## Correlations between priority areas and employment shares across NACE sectors



- Few regions match well their economic profiles.
- Greek, Romanian, and Polish regions better matched their economic profiles.
- Empirical regularity: the regions that best match economic profiles are mostly **transition and less developed regions**



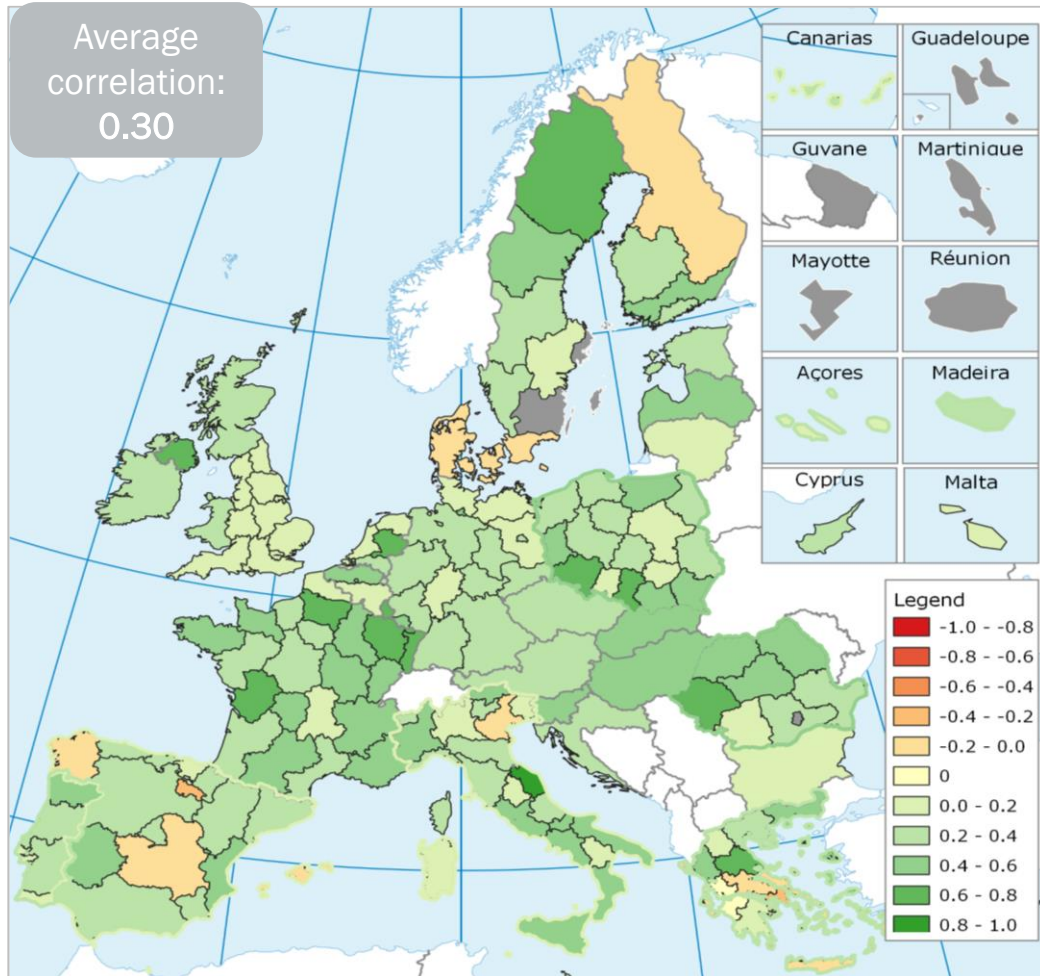
### Evidence from case study

**Western Macedonia** (correlation: 0.5): region with engines of growth in transformation

Source: Prognos / CSIL (2021).

# How prioritisation reflects **scientific** profiles?

## Correlations between priority areas and publications shares across scientific fields



Source: Prognos / CSIL (2021).

- A great variety of regions and MS followed this approach.
- French, Swedish, Polish, Romanian, and Portuguese regions match well their scientific profiles.
- Comparison with Publication location quotients and indicators of Scientific Excellence suggests that it was **easier to target areas of scientific production than areas of strength and excellence!**

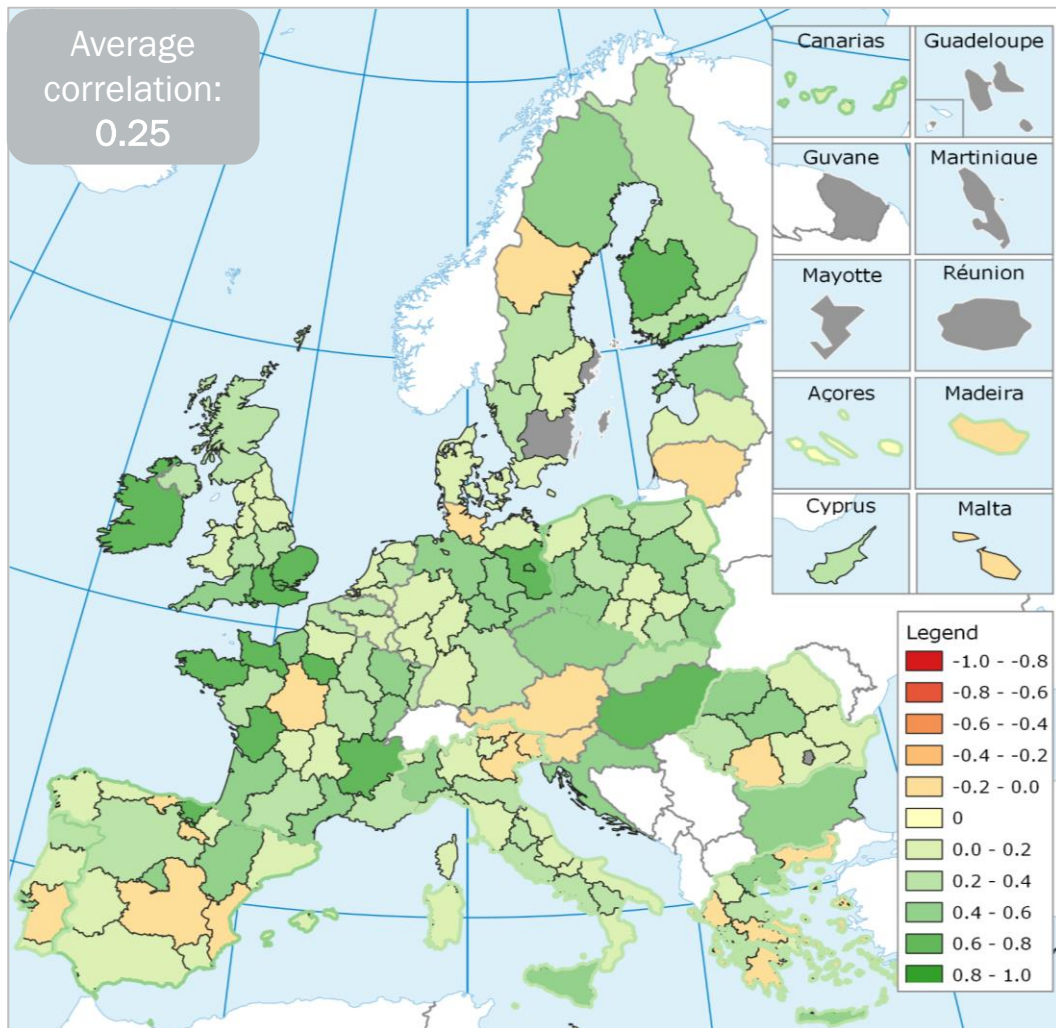


### Evidence from case study

**Picardie** (correlation: 0.6): region where universities have a strong influence (as several in the country)

# How prioritisation reflects the **technological** strengths?

## Correlations between priority areas and patent shares across technology fields



- S3 priorities match **well** technological profiles.
- Most of the regions that better reflected their technological profile in the RIS3 are **more developed regions**, also classified as **innovation leaders** or **strong innovators**.



### Evidence from case study

**Berlin/Brandenburg** (correlation: 0.7):  
*'Strengthening strength' Approach*

Source: Prognos / CSIL (2021).

# Categorisation of S3 according to their correspondences with the MS/regional profiles

## Four groups of strategies:

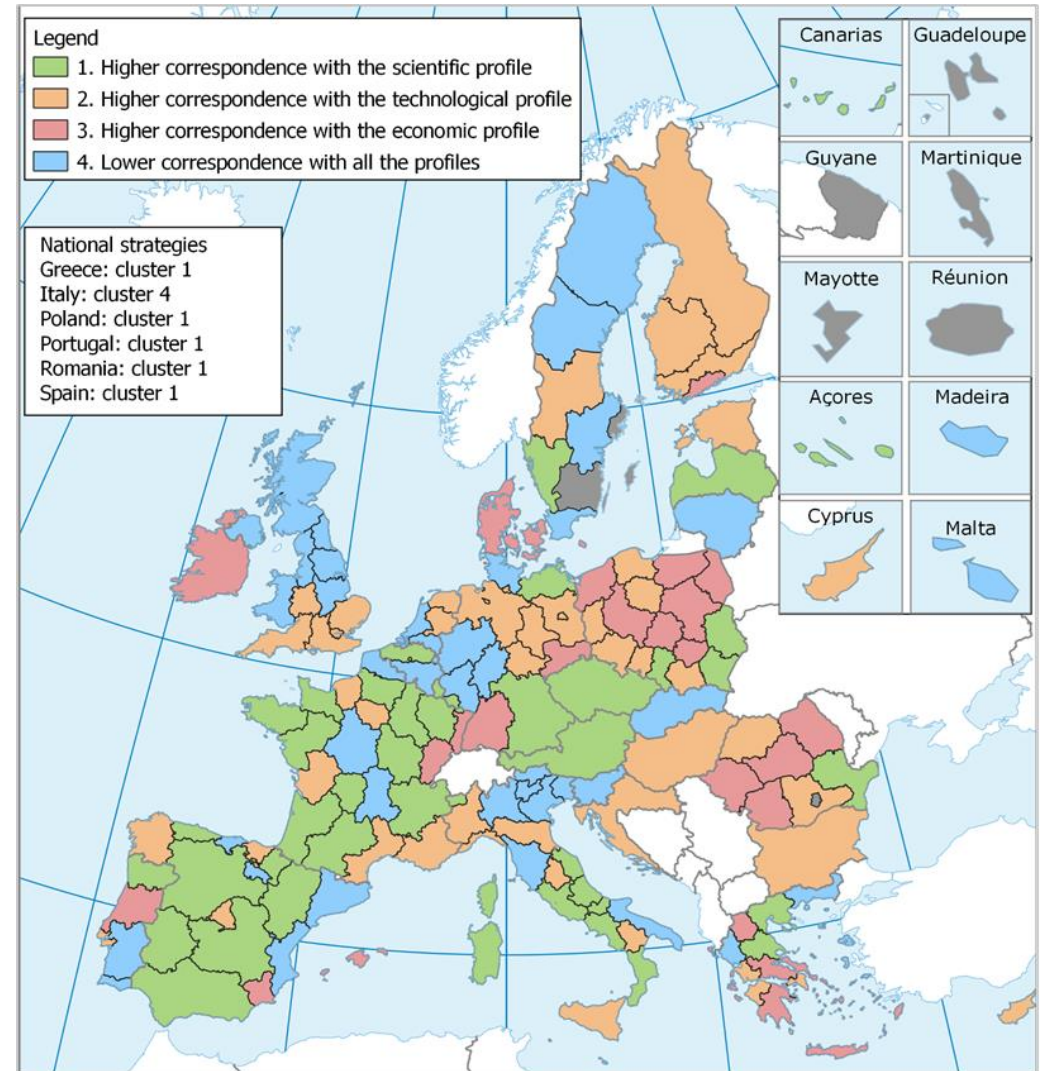
1. 61 (**29%**) S3 strategies match well the **scientific profiles**
2. 62 (**30%**) S3 strategies match well the **technological profiles**
3. 33 (**16%**) S3 strategies have a good level of correspondence with the **economic profiles**
4. 53 (**25%**) S3 strategies **do not match well any profile** but reveal **higher ambition** in terms of technological innovation and diversification goals



## Evidence from case studies

Different **prioritisation philosophies** utilized, from path dependence to more disruptive approaches:

- Upgrading along the value chain (**Denmark**)
- Mix of more/less related and complex technologies (**Dolnośląskie**)



Source: Prognos / CSIL (2021), based on a Principal Component Analysis and a hierarchical cluster analysis. The map shows the cluster corresponding to the most recent versions of the S3 strategies.

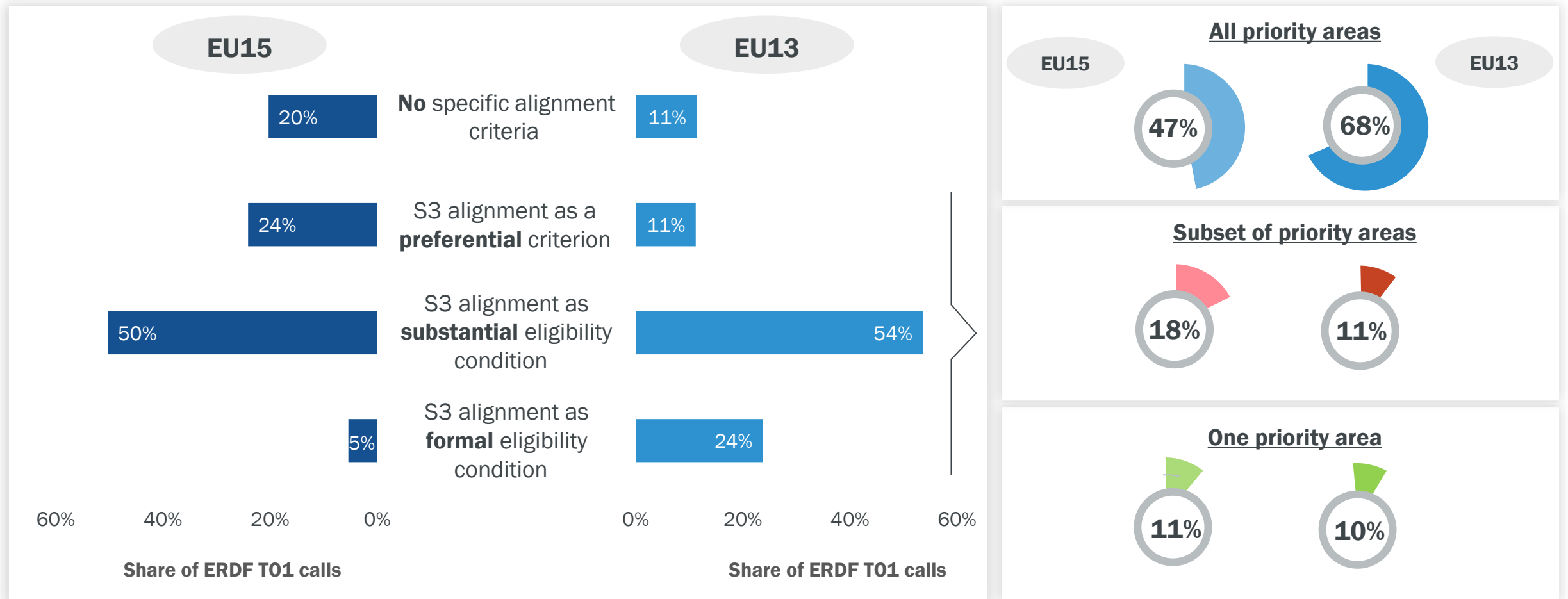


© iStock - Willie B. Thomas

## Implementation of S3 priorities

# How was the prioritisation reflected in the preparation and implementation of calls?

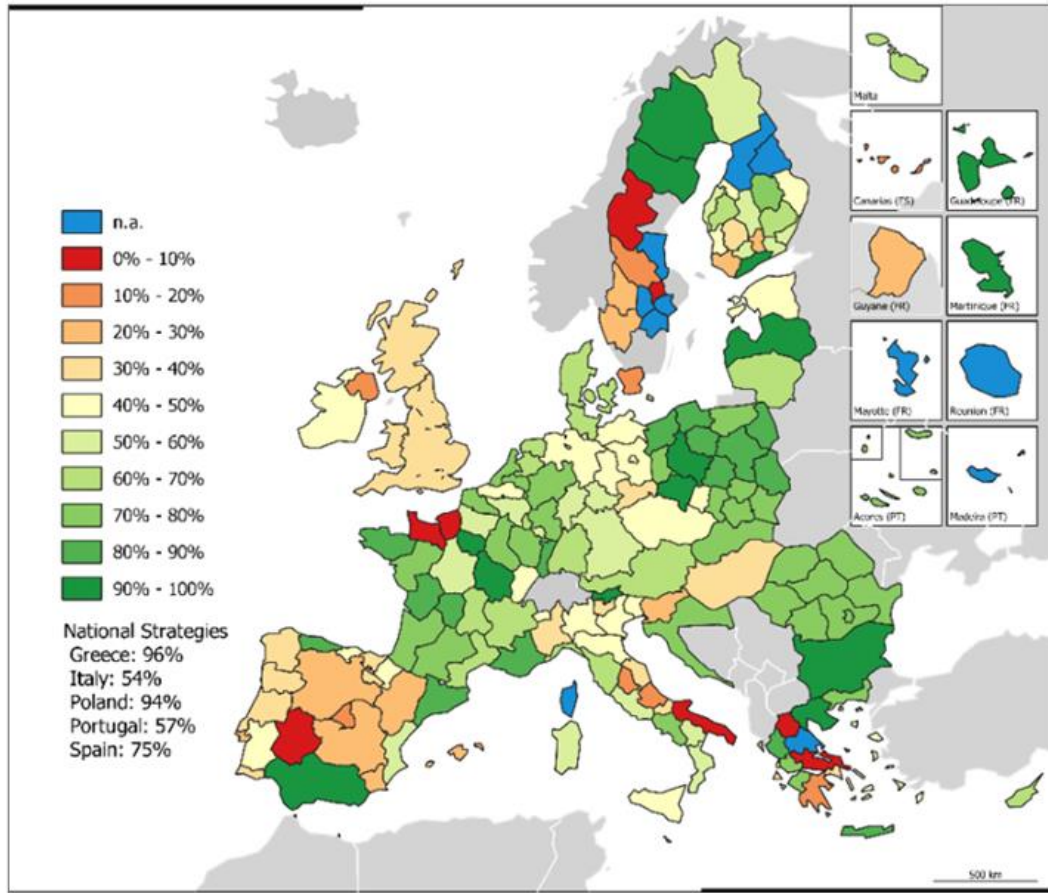
## S3 alignment criteria of ERDF T01 calls and priority areas addressed by these calls, EU15 vs. EU13



Source: Prognos / CSIL (2021). Note: To account for large variations in the number of calls between the regions the share in each region was computed and then averaged out.

# Has the selection process led to the projects' implementation in the priority areas?

## Share of projects that are linked to the priority areas in the region



- **57% of all ERDF-funded projects considered** (49,749 out of 86,487) display a linkage to the corresponding S3 priorities
- The overall budget that has been linked to these projects in S3 priority areas is **EUR 19.6 billion**.

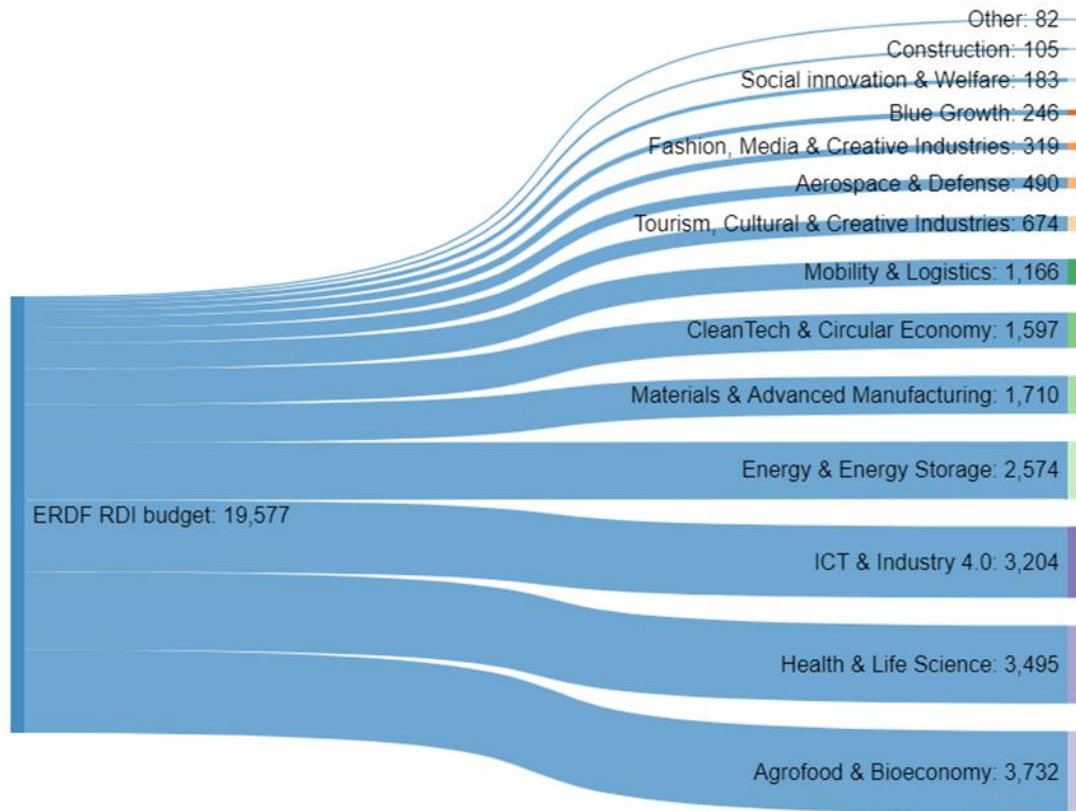
The **case studies** illustrate certain specificities within MS/regions:

- **Denmark:** Some regions experienced a lack of critical mass in certain specialisation fields → **too many priority areas**.
- **Picardie / Lithuania:** Implementation showed that **too specific priorities** have led to the exclusion of relevant projects.
- **Western Macedonia:** **Imbalances** of resources between national and regional OPs.



# Has the selection process led to focus on S3 areas?

## Overarching thematic domains and total budget spent on ERDF projects



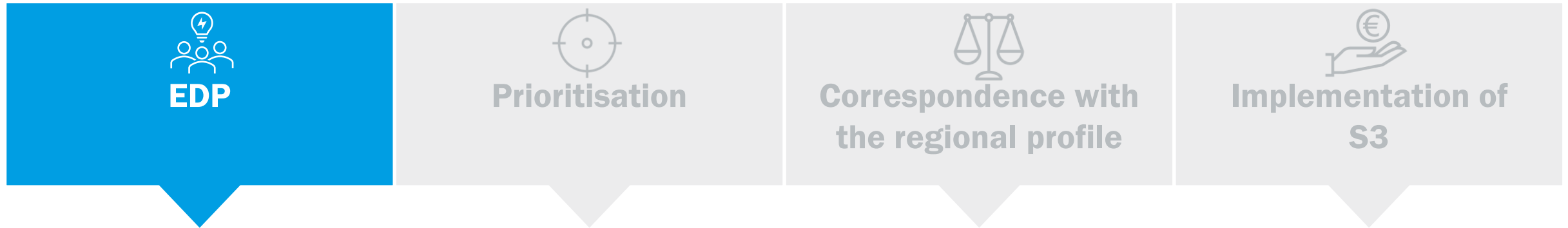
- Altogether almost **EUR 19.6 billion** have been channeled into projects in the S3 priority areas
- Around **50% of these project budgets has been directed towards three thematic domains:**
  - ‘Agrofood & Bioeconomy’ (19%),
  - ‘Health & Life Sciences’ (18%),
  - ‘ICT & Industry 4.0’ (16%)



© imagepoint – Mark Brun

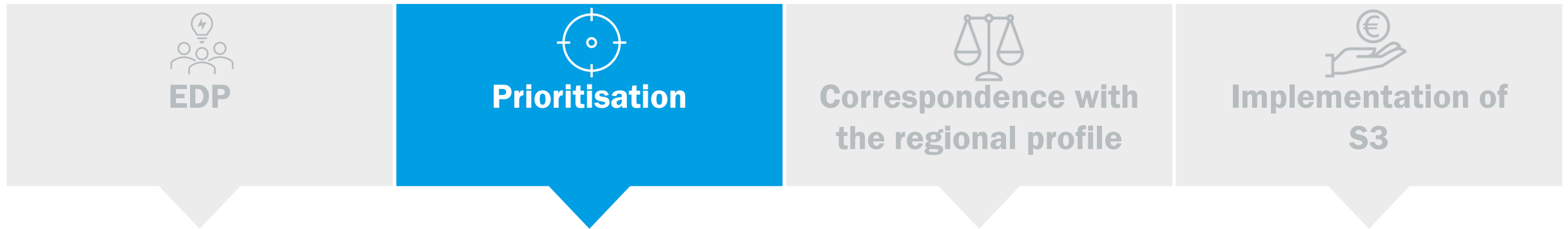
## Summary of the findings

# Findings (1) - Has a prioritisation been achieved in the S3?



- A **broad stakeholder process** has been applied in the majority of Member States/regions.
- But: A **continuous EDP could not be established** in many regions, although formal continuity was slightly higher in EU13/less developed regions.
- **Data analysis** to determine S3 priority areas has in many cases **not been sufficiently granular**.
- But: Member States/regions have used a wide range of **different instruments and processes** when it comes to the EDP and data analysis.

## Findings (2) - Has a prioritisation been achieved in the S3?



- The most **prevalent topics** addressed in the S3 priority areas are linked to **engineering and ICT-related fields**.
- **Priority areas** are mostly based on a **combined priority-setting approach** and are generally not framed in terms of single scientific, economic, or technological fields.
- There are only very **minor regional differences regarding the degree of complexity of S3 strategies** and their priority areas.
- Referring to the **absolute number of priority areas** is misleading, especially for Member States/regions that use a multi-level (tree-shaped) structure with a few broadly defined main priority areas and several sub-priorities.
- **Larger and economically stronger** Member States/regions seem to prioritize less compared to smaller regions

# Findings (3) - Do the priorities reflect the regional profile?



EDP



Prioritisation



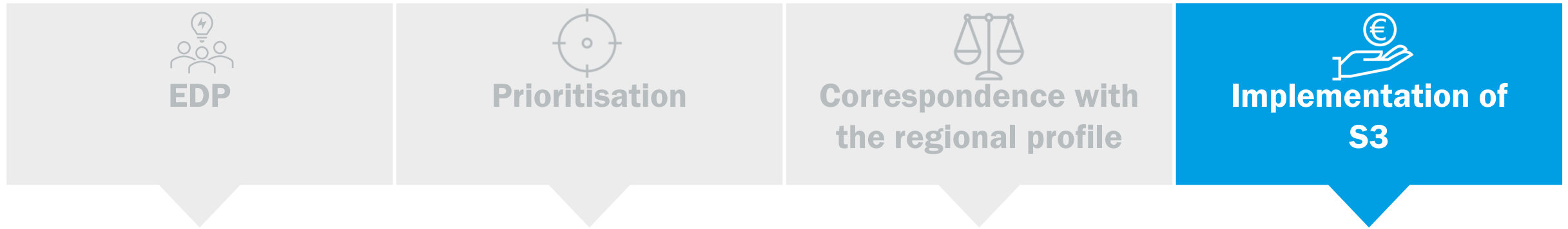
Correspondence with  
the regional profile



Implementation of  
S3

- S3 priority areas generally **do not match** the **economic profiles** of the Member States/regions (according to any employment-based indicator used).
- Priority areas of S3 strategies **often match** the **scientific profiles** of EU countries and regions
- S3 priorities **generally match** the **technological profiles** of Member States/regions
- Several S3 strategies selected priority areas closer to their **knowledge space**
- **Four groups** of S3 strategies emerge when considering the overall correspondence of S3 priorities with the national/regional profiles:
  1. **61 S3 strategies** match particularly well with their **scientific profile**
  2. **62 S3 strategies** match particularly well with their **technological profile**
  3. **33 S3 strategies** have a good level of correspondence with the **economic profile**
  4. **53 S3 strategies** do not match well with **any profile**, but reveal higher ambition in terms of **technological innovation and diversification goals**
- S3 strategies that achieved a **good match** with their scientific, technological, and economic profiles generally have **more broadly and vaguely defined priority areas**

# Findings (4) - How has the S3 been implemented?



- **ERDF funded calls/programmes** predominantly require an **alignment to the S3 strategies**.
- **Linkages** between ERDF-funded R&I projects and S3 priorities were found **for 57% the projects** but there are substantial differences among MS/regions
- **Strict S3 eligibility criteria** seem overall to be well applied in the project selection processes and support the selection of projects linked to priority areas
- The most frequently addressed **priority areas of S3 strategies** are also reflected in the **implemented R&I projects**.



© imagepoint – Mark Brun

## **Suggestions for prioritisation and implementation mechanisms of S3**

# Improving prioritisation approaches in future S3 strategies

## Identification of econ. / scient. / techn. potentials

1. The identification of potential priority areas requires a more **holistic, fine-grained and dynamic perspective**
2. Potential priority areas of S3 strategies need to be positioned in a **global perspective**

## Identification of cross-sectoral & transformative areas

1. Identifying innovation strengths by using data from competitive **public funding programmes**
2. Mapping and profiling S3 priority areas using **unstructured data and semantic analysis**
3. Analysing the **related variety** of potential specialisation domains





# Better utilisation of innovation strength and improved monitoring

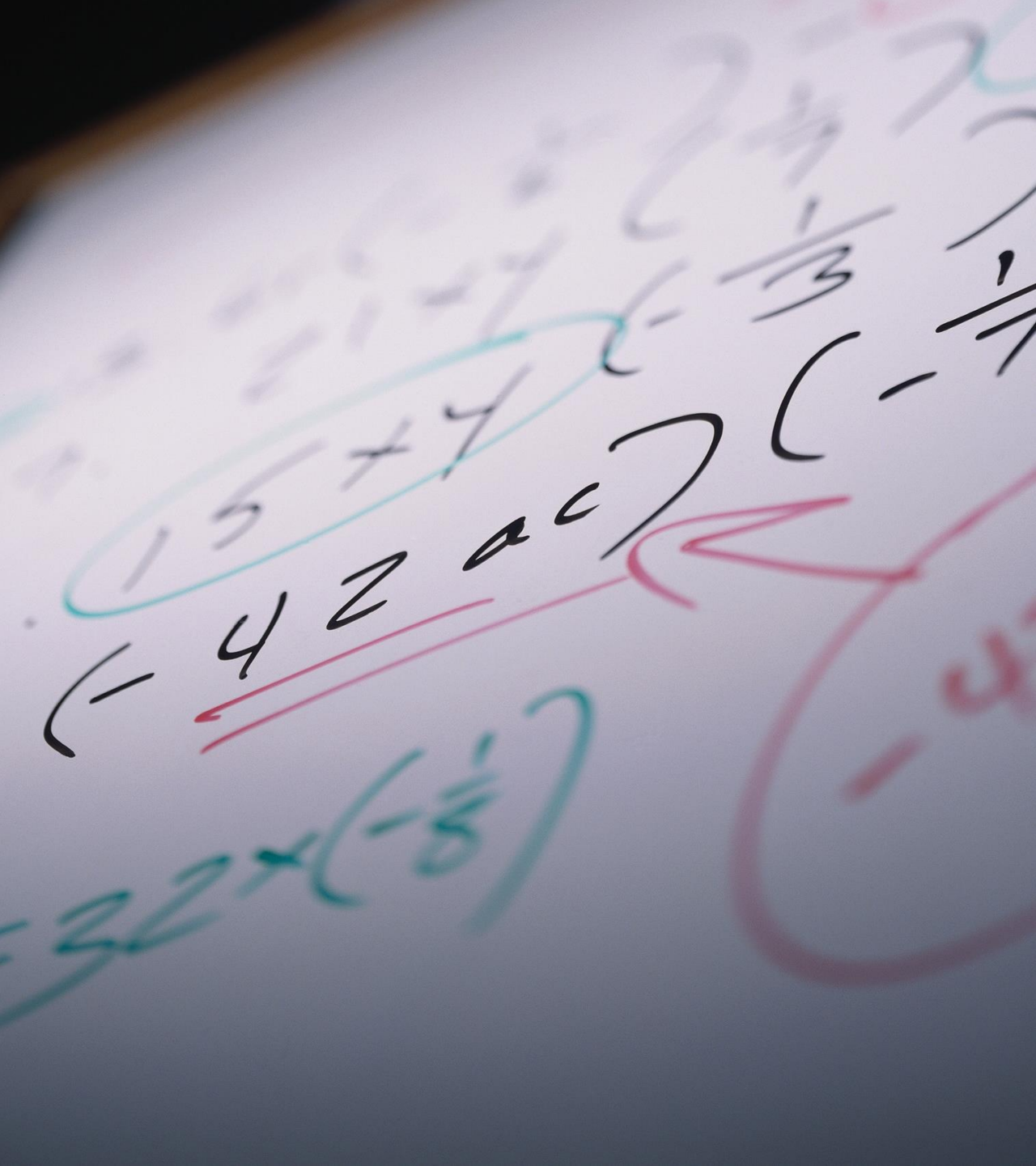
## Governance and EDP / Implementation

1. Build up **more effective and participatory governance** structures for the implementation of S3 strategies
2. Enlarge and improve the **outcomes of the EDP**
3. Enhance the promotion of supra-regional and international forms of **cooperation and networking**
4. Optimise the process from S3 strategy to implementation through “**transformation roadmaps**”
5. Reshape the **policy mix & funding instruments** for the support of S3 priority areas

## Monitoring and evaluation

1. **Upgrade and fine-tune** S3 monitoring systems, establish thorough S3 evaluation plans
2. Aim for more **holistic communication** on S3 strategies



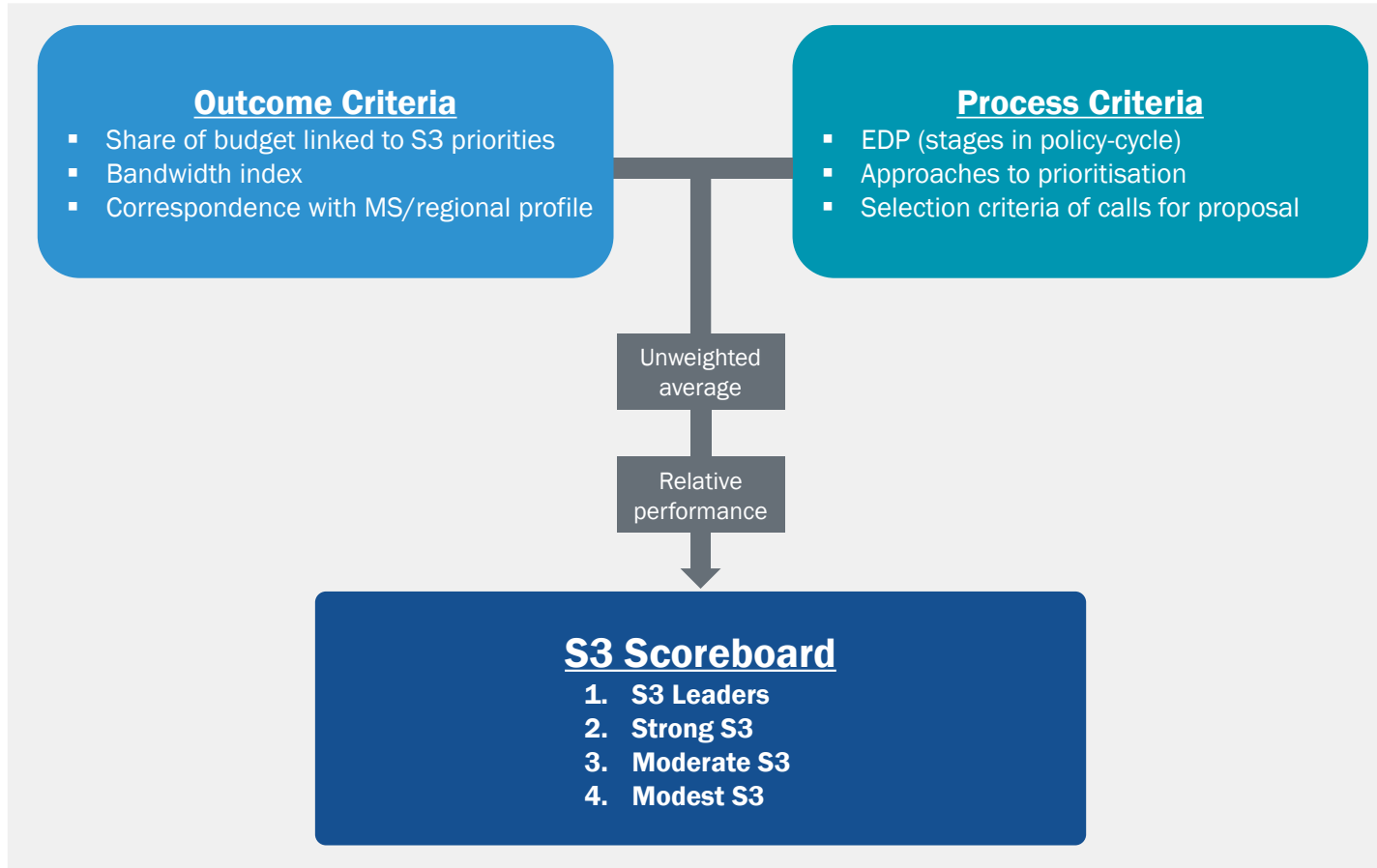


© imagepoint - Mark Brun

## S3 Scoreboard 2021

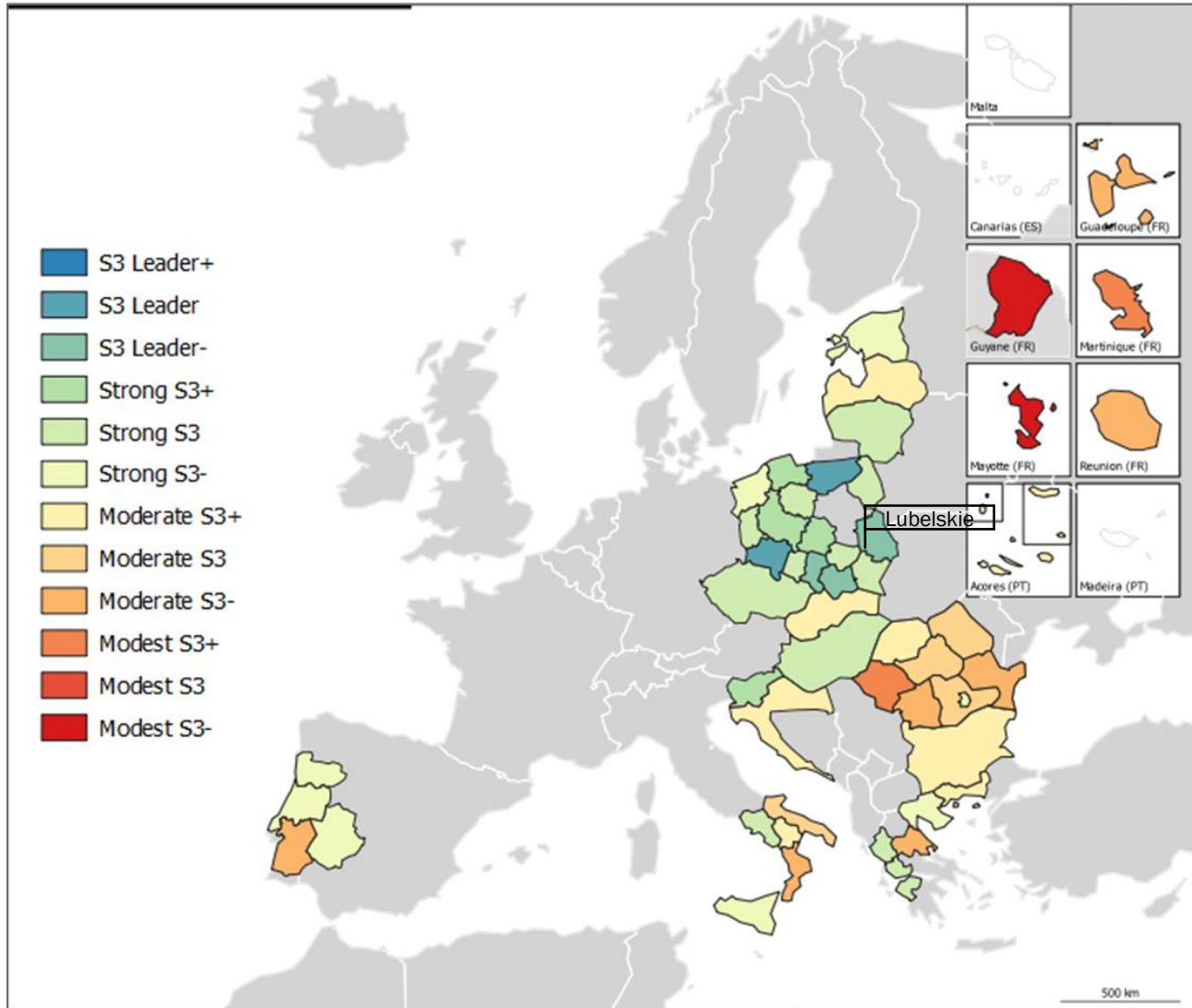
# From categorising the variables to the S3 Scoreboard 2021

## Unweighted average approach & classification by relative performance



- Classification of variables into **outcome** and **process criteria**
- Application of an **unweighted average approach** (50% outcome criteria; 50% process criteria)
- Assessment of MS & regions according to their **relative performance to Cohesion Group averages**:
  1. **S3 Leaders**
  2. **Strong S3**
  3. **Moderate S3**
  4. **Modest S3**
- More detailed breakdown of performance groups by splitting each group into thirds (e.g.; S3 Leaders+, Moderate S3-, ...)

# S3 Scoreboard – Less Developed Regions (*LDR average*)



Source: Prognos / CSIL (2021). n= 55 strategies

## Key interpretation

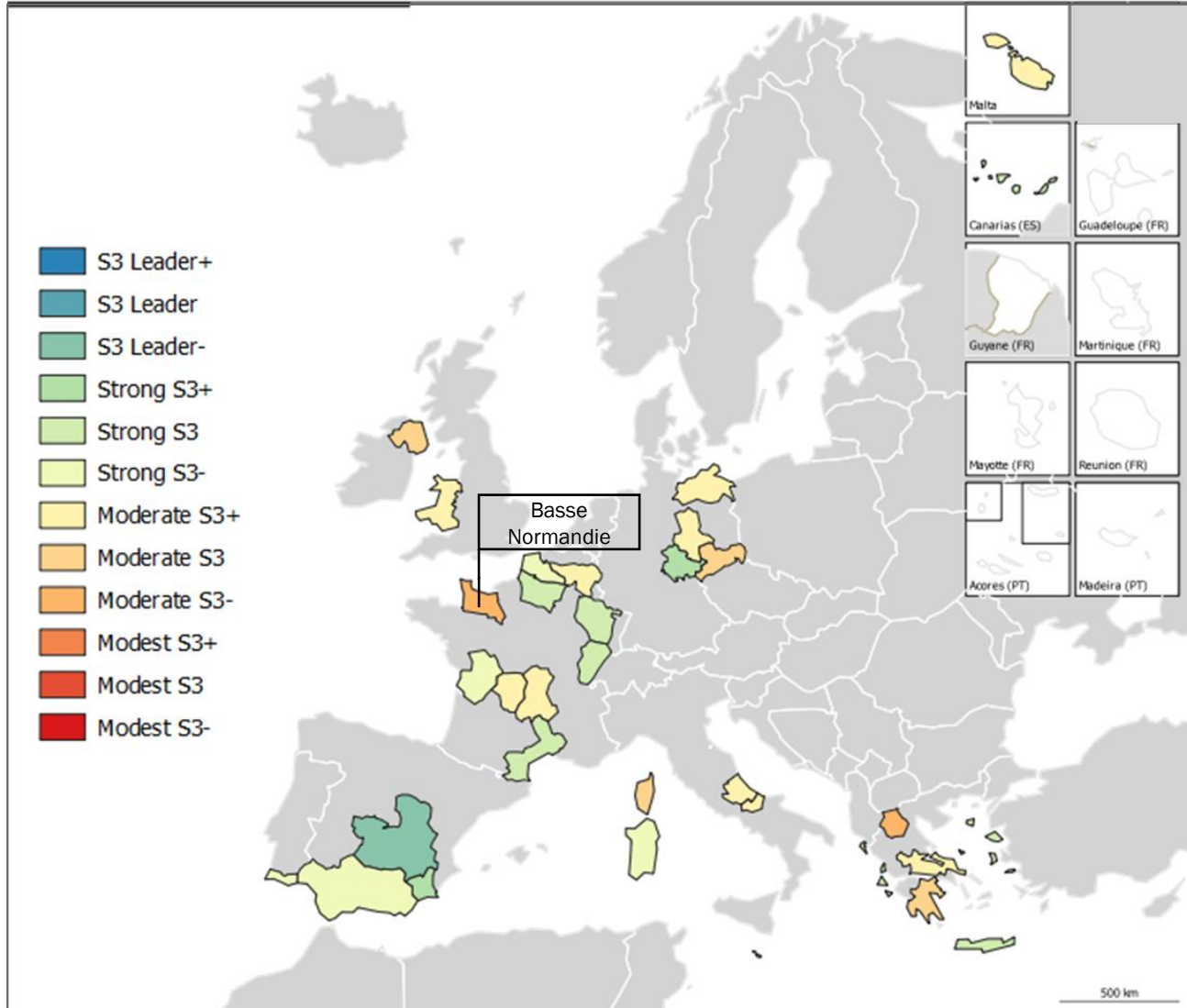
- Less developed regions perform relatively well – better than expected
- 31 out of 55 Less Developed Regions are classified as ‘Strong S3’ or ‘S3 Leader’
- Thus: Many regions that have *low* innovation capacities and *low* institutional capacities perform relatively well in the S3 scoreboard



## Example - Lubelskie (Poland):

- Scoreboard-Group:** S3 Leader-; with 130 points Lubelskie is among the top LDR
- Project budget:** around 74% of the budget is concentrated on Lubelskies S3 priority areas
- Bandwidth Index:** with 29% the S3 strategy has a medium-narrow thematic bandwidth.
- Quality of the prioritisation:** around 66% of the priority fields can be explained by economic sectors or technological/scientific fields.
- Quality of project selection:** project selection followed a strict selection mechanism. Most calls for proposals required a matching with priority areas

# S3 Scoreboard – Transition Regions (TR average)



## Key interpretation

- Mixed picture of Transition regions.
- 16 out of 33 regions are classified as Strong S3 or better
- 17 regions are Moderate S3 and perform below the Cohesion Group average

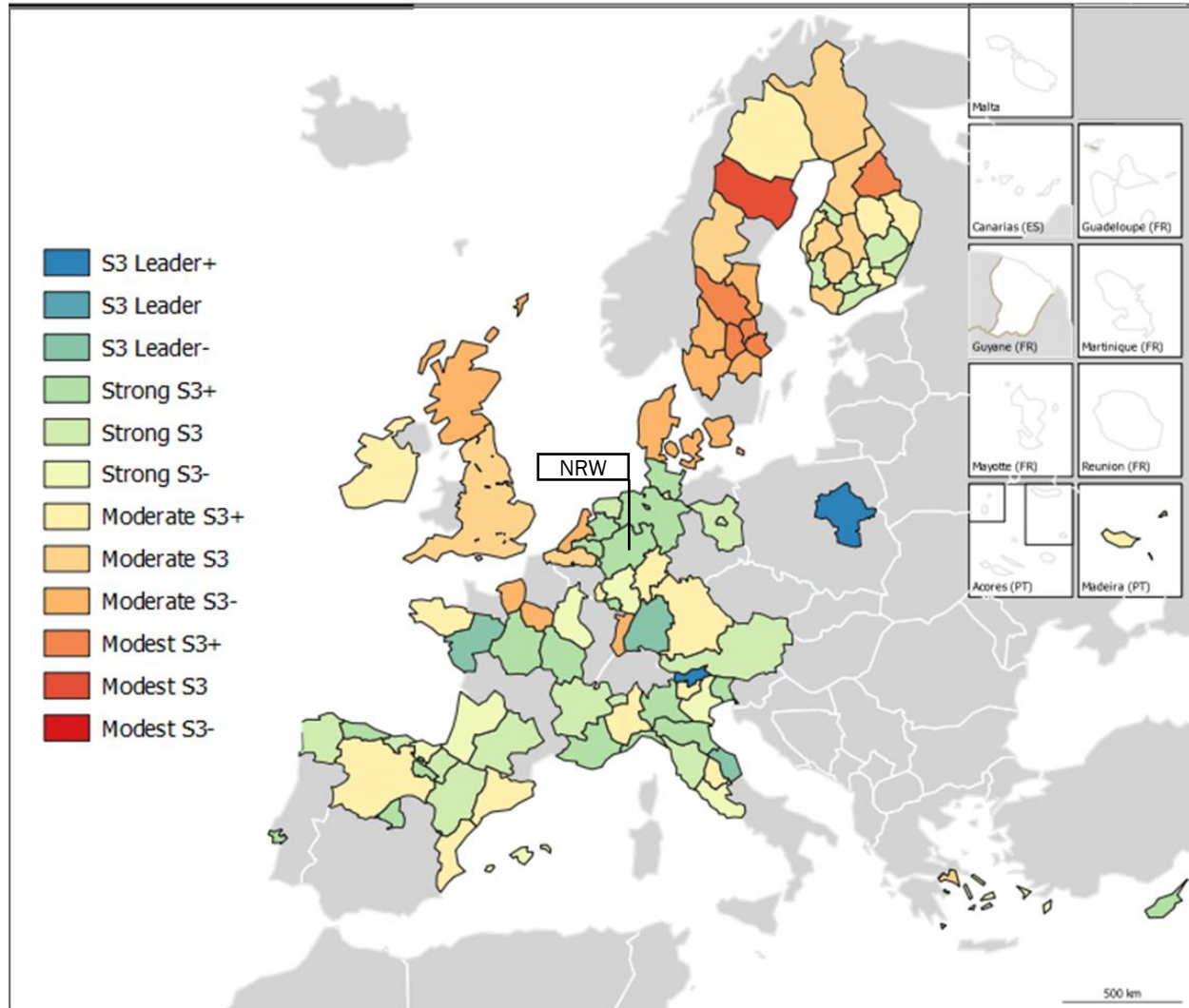


## Example - Basse Normandie (France):

- **Scoreboard-Group:** Moderate S3-; with 78 points Basse Normandie performs below the Cohesion Group average
- **Project budget:** around 8% of the budget is concentrated on the priority areas
- **Bandwidth Index:** with 62% the S3 strategy is characterised by a medium-broad thematic bandwidth.
- **Quality of the prioritisation:** around 68% of the priority fields can be explained by economic sectors or technological/scientific fields.
- **Quality of project selection:** project selection followed a loose selection mechanism. Some calls for proposals required a matching with priority areas, others did not require an alignment with S3

Source: Prognos / CSIL (2021). n= 33 strategies

# S3 Scoreboard – More Developed Regions (MDR average)



Source: Prognos / CSIL (2021) n= 97 strategies

## Key interpretation

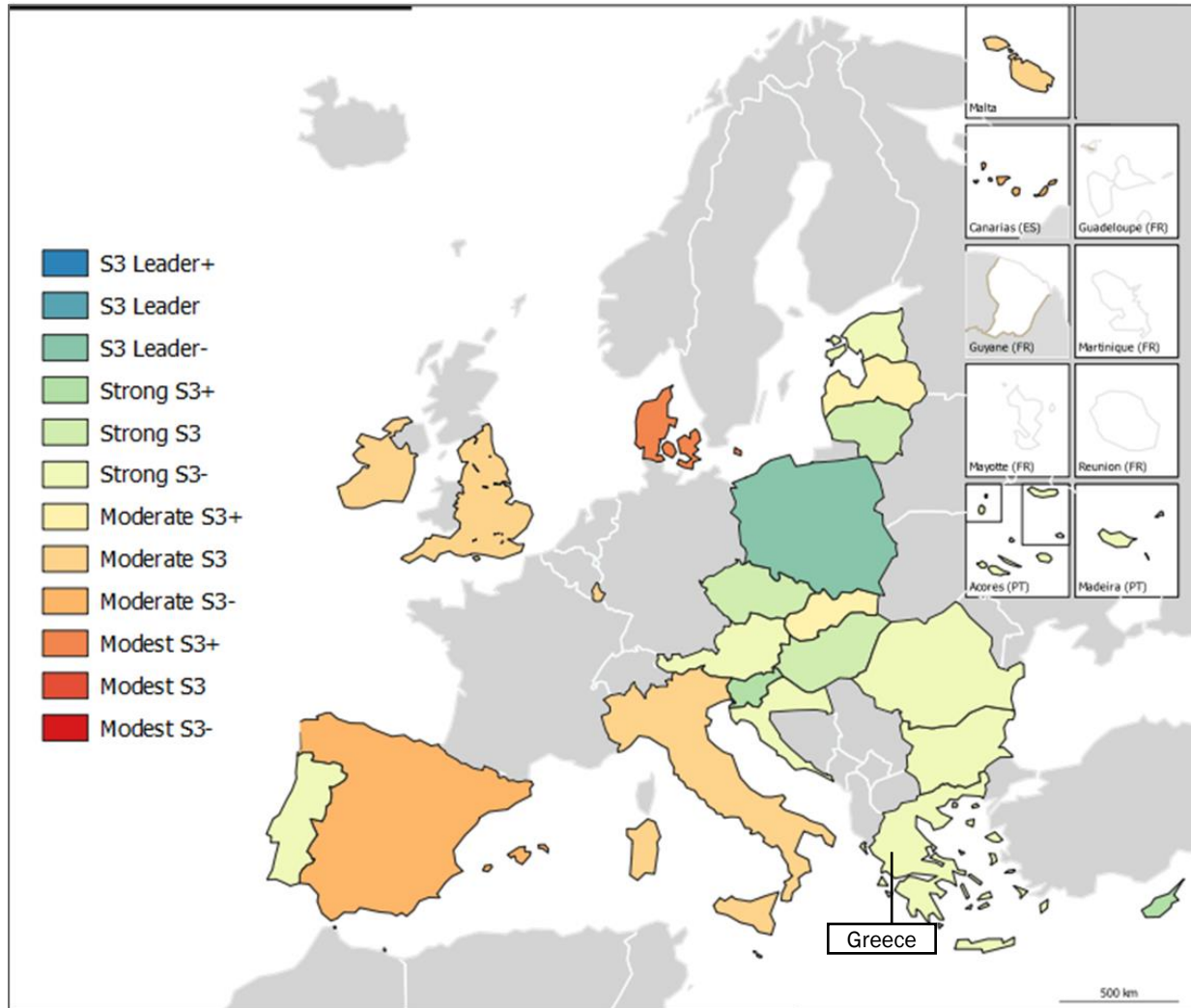
- Some regions that perform strongly in the RIS 2021 and EQG 2017 underperform in the S3 Scoreboard
- Nordic paradox: regions may have followed the S3 approach to some extent but did not fundamentally change their policies and policy approaches as a consequence of it.



## Example - North Rhine-Westphalia (Germany):

- Scoreboard-Group:** Strong S3+; with 117 points NRW is 17% above the MDR-average
- Project budget:** around 72% of the budget is concentrated on NRW's priority areas
- Bandwidth Index:** with 58% the S3 strategy is characterised by a medium thematic bandwidth.
- Quality of the prioritisation:** around 63% of the priority fields can be explained by economic sectors or technological/scientific fields.
- Quality of project selection:** project selection followed a strict selection mechanism („Leitmarkt Wettbewerbe“). Most calls for proposals required a matching with priority areas

# S3 Scoreboard – National strategies (*National average*)



## Key interpretation

- National strategies perform relatively well in the S3 Scoreboard
- Some regions pursued S3 strategies based on more disruptive forms of innovation that build on regional capabilities



## Example - Greece:

- **Scoreboard-Group:** Strong S3-; with 104 points Greece performs 4% above the national strategy average
- **Project budget:** around 77% of the budget is concentrated on Greece's priority areas
- **Bandwidth Index:** with 59% the S3 strategy is characterised by a medium thematic bandwidth.
- **Quality of the prioritisation:** 70% of the priority fields can be explained by economic sectors or technological/scientific fields.
- **Quality of project selection:** project selection followed a rather strict selection mechanism. Majority of calls for proposals required an alignment with priority areas

Source: Prognos / CSIL (2021). n= 22 strategies

# Variables used in the Scoreboard – Outcome criteria

## The variables mirror the process of smart specialisation

	Category	Variables	Description	
Outcome Criteria	Implementation of the S3	Share of budget linked to priority areas	<b>This indicator shows the correspondence between implemented projects and the regions' priority areas.</b> It displays the shares of budget for each Member State or region that are linked to the priority areas.	
	Thematic broadness	Bandwidth index	<b>The index of bandwidth indicates the thematic broadness that a S3 strategy covers.</b> It is measured by the degree to which the strategy targets all the possible economic sectors, scientific and technological fields. It is defined as a %-share, where the number of economic sectors, scientific and technological fields targeted by the strategy is divided by the total number of existing economic sectors, scientific or technological fields (respectively 88 economic sectors, 22 scientific fields, 35 technology fields). Hence the share ranges between 0% and 100%. In this way it can be seen if a strategy is: <ul style="list-style-type: none"> <li>▪ “Narrowly” defined (lower index), meaning that it picked only a few economic sectors, scientific and technological fields.</li> <li>▪ “Broadly” defined (higher index), meaning that it focuses on many economic sectors, scientific and technological fields.</li> </ul>	
	Correspondence of S3 strategies	Correspondence with economic profile		<b>These indicators show a Member States or regions Pearson correlation coefficient with the average employment / patent / publication share</b> in the three years before the strategy implementation and the priority areas of the S3 strategy. A correlation coefficient higher than 0 indicates a positive correspondence between the S3 priority areas and the Member State/regional profile. Conversely, a correlation coefficient lower than 0 indicates a negative correspondence between the S3 priority areas and the Member State/regional profile. The higher the coefficient in absolute terms (i.e., the closer it is to 1 or -1), the stronger the positive or negative correspondence. Only positive correspondences were considered In the Scoreboard.
		Correspondence with technological profile		
		Correspondence with scientific profile		



# Variables used in the Scoreboard – Process criteria

The variables mirror the process of smart specialisation

	Category	Variables	Description
Process Criteria	Development process of S3 (EDP)	Degree of continuity of EDP	<p><b>Number of stages in the policy-making cycle in which the S3 was used</b></p> <p>The S3 policy-making cycle covers the three stages Policy formulation, Decision-making and implementation, and Monitoring, evaluation &amp; updating. For the construction of this indicator, it was considered whether a strategy used the S3 in all, two or in one stage. In other words, the indicator shows the number of stages in which the EDP was used. The underlying data was collected by country experts in interviews with S3 managing authorities.</p>
	Quality of the prioritisation approach	Economic approach to prioritisation	<p><b>These indicators show the extent to which a Member States or regions priority areas are economically/technologically/scientifically driven.</b></p> <p>Share indicates the extent to which priority areas can be explained through NACE sectors / Technological fields / Scientific fields. This has been based on a matching approach between priority fields and their description with NACE sectors /Technological fields / Scientific fields.</p>
		Technological approach to prioritisation	
		Scientific approach to prioritisation	
Implementation of the S3	Quality of the selection process	<p><b>This indicator is a measure of the strictness of calls for proposals.</b></p> <p>It is measured by the degree to which the priority areas had to be addressed. The indicator is constructed as a weighted average by assigning values to the four alignment criteria which were then multiplied with the Member States or regions share of calls of proposal with this alignment criteria.</p> <p><u>The assigned values are the following:</u></p> <ul style="list-style-type: none"> <li>4 = S3 alignment as an eligibility condition – formal</li> <li>3 = S3 alignment as an eligibility condition – substantial</li> <li>2 = S3 alignment as a preferential criterion</li> <li>1 = No specific alignment criteria</li> </ul>	

# Thank you very much



**Dr. Jan-Philipp Kramer**  
Principal |  
Head of EU-Office

 + 49 173 2925335

 [jan.kramer@prognos.com](mailto:jan.kramer@prognos.com)

**Address**  
Résidence Palace,  
Rue de la Loi 155  
1040 Brussels



**Emanuela Sirtori**  
Partner and  
Senior researcher

 +39 02 84105514

 [sirtori@csilmilano.com](mailto:sirtori@csilmilano.com)

**Address**  
Corso Monforte 15  
20122 Milano



**Dr. Jürgen Wastl**  
Director of Academic  
Relations and Consultancy

 +49 160 90441304

 [j.wastl@digital-science.com](mailto:j.wastl@digital-science.com)

**Address**  
6 Briset St,  
London, EC1M 5NR